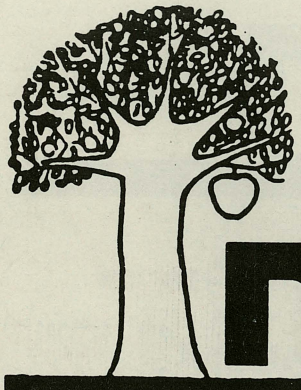
VOL. 5 NO. 4
APRIL 1983

$2.00



neat notes

THE NEWSLETTER OF NEW ENGLAND APPLE TREE

April 1983 N.E.A.T. Meeting

The April meeting will be held at 7:30 P.M. on the third Wednesday of the month (as usual), April 20, 1983 at the Mitre cafeteria. Mitre is on rte 62 in Bedford Ma. Take route 3 north from rte 128 to the first exit (rte 62).

APRIL'S PROGRAM

Well folks. I told you we needed some help setting up programs and as has happened in the past, at the time of writing this I haven't got anything with which to lure you out of your easy chair. I am sorry for those of you who have just come on board and can only promise that we will have something interesting by the 20th. To those of you who have been spoon fed for the last year or two and contribute only criticism I remind you once again that the officers, chairpeople, librarians, storekeepers, speakers, and other volunteers get nothing for their time and energy but the satisfaction of seeing the new members come up to speed and begin to enjoy the world of computing and the Apple. If you would like to pay your "dues" I will be glad to listen to your criticism as well.

FUTURE SCHEDULE IS TENTATIVELY AS FOLLOWS:

May 18,1983----------We STILL need some HELP setting up
June 15,1983----------programs for future meetings. If you can
July 20,1983----------help make connections with the publisher
August 17,1983--------or manufacturer of a new product or if
September 21,1983-----you would like to demonstrate one you
October 19,1983-------have been using contact Lou Tarsa
November 16,1983------or Dave Reed.

December 21,1983------

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THE NEWSLETTER OF NEW ENGLAND APPLE TREE

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Advertising Manager....
HELP !!!

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Vice-pres.....Dave Reed,692-7547
Vice-pres.....Lou Tarsa,823-8106
Secretary.Jeannine Giffee,497-9050
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Attn. Editor,NEAT Notes
P.O.Box 2652
Woburn,Ma 01801

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NEAT NOTES Gets Around
by Dave Reed

I am proud to say that two more articles from our newsletter have been reprinted by the Daytona Beach Apple Users Group. John Shaw's November Machine Language column was reprinted and some of my IAC News Recaps from December and New Product Announcements from the same issue. Congratulations John!

N.E.A.T.
Steering Committee Meeting
March 7, 1983
By Jeannine Giffee

Present: Jerry Connelly, Dave Reed, Joe Stivaletta, Jeannine Giffee, John Shaw.

This month's SCM focused on 3 topics; 1) The upcoming elections for club officers in May, 2) APPLEFEST, and 3)Membership Participation.

ELECTIONS - The membership will be informed of the need to consider this issue and, hopefully, some individuals will think about running for office. All elected positions are open. These include President, Vice President(s), Treasurer, and Secretary. This year's officers will not be running for re-election, therefore, N.E.A.T. will be seeking leadership from the membership at large. If you have an interest in any of these positions please feel free to contact a club officer to find out the duties involved.

APPLEFEST - John Shaw and Elliot Entin have graciously volunteered to co-chair the APPLEFEST committee. They are anxiously seeking volunteers to help them make the N.E.A.T. booth an exciting and informative exhibition. Our goals are to increase membership and to raise funds. If you have time and/or ideas to donate, contact either John or Elliot at the next meeting or contact a club officer who will direct you to them.

MEMBERSHIP PARTICIPATION - N.E.A.T. is going through a critical period right now. We are seeking persons with a desire to uphold the quality of the group. We are constantly making pleas for assistance with the newsletter, with the library, with advertising, with special events. However, only the efforts of a few have been donated for the service of all. Up until now this has kept the club going but it is the responsibility of the membership to participate. It's YOUR club. Be a part of it!

CALENDAR
Compiled by Raines Cohen

April 4 7PM
NEAT Steering Committee Meeting
Jerry Connelly's Office
call 497-9050

April 6 7:00PM
New England Computer Society
Mitre Cafeteria
call 646-3080

Apr 8-10 10AM-6PM
Eighty/Apple/PC Computer Show
N.Y. Statler Hotel
7th Ave. & 33rd. St.
Regular fee $6 Children $2

April 9
NECS SWAP MEET/FLEA MARKET
Waltham VFW Post #2152
210 Felton St.
Waltham, Ma.
call 449-3000

April 9 10:00AM
North Shore Apple Group
Computer City,Danvers
call 546-3104

April 16 9:30AM
Apple Guild
Massasoit Community College
call 767-1303

April 20 7:30PM
New England Apple Tree
Mitre Cafeteria
call 497-9050

WHAT ARE YOU WAITING FOR???

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dsr

	APPLE DOS	DIVERSI-DOS
SAVE ‡	27.1 sec.	5.9 sec.
LOAD ‡	19.2 sec.	4.5 sec.
BSAVE*	13.6 sec.	4.1 sec.
BLOAD*	9.5 sec.	2.6 sec.
READ**	42.2 sec.	12.4 sec.
WRITE**	44.6 sec.	14.9 sec.

* Hi-res screen ‡ 80-sector BASIC program
** 52-sector random access text file

April 20 6:30PM
Apple/Boston
B.U, Sherman Union
call 227-9178

April 23 2:30PM
Newton Apple Kids
Raines Cohen's House
call 965-0033

April 27 7:30PM
Boston Computer Society
New England Life Hall
call 227-9178

April 28 7:30PM
PASCAL Boston Computer Society
MIT 1-146
call 227-9178

May 2 7:00PM
NEAT Steering Committee Meeting
Jerry Connelly's Office
call 497-9050

May 4 7:00PM
New England Computer Society
Mitre Cafeteria
call 646-3080

May 13-15 10:30AM-5:30PM
APPLEFEST/BOSTON
Bayside Exposition Center
call 800-841-7000

May 14 10:00AM
North Shore Apple Group
Computer City, Danvers
call 546-3104

May 18 7:30PM
New England Apple Tree
Mitre Cafeteria
call 497-9050

May 21 9:30AM
Apple Guild
Massasoit Community College
call 767-1303

May 28 2:30PM
Newton Apple Kids
Raines Cohen's House
call 965-0033

June 3-5 10:30AM-5:30PM
East Coast Computer Faire
Hynes Auditorium
call 739-2000

THE OIL THAT MAKES THE WHEELS GO 'ROUND AND THE MACHINE RUN SMOOTH.

by Dave Reed

May will be election time again and time for each of you to give consideration to actively participating in the running of NEAT. Each year a very small number of the members come forth to run for office and volunteer to help with one of the many tasks associated with our User's Group. Those few usually get burnt out after one or two years in office because the rest of you let them try to do everything. Well this year I would like to see many more members involved in the running of NEAT. To that end I will try to list as seperate tasks as many of the duties as possible. It is my hope that in addition to filling the club offices at election time we can also end up with a list of members who will help the Officers with the many duties that need to be performed to make the group run smooth. You should be willing to make a commitment to performing the duties and coordinating your activities with one of the Officers at least twice a month at the steering committee meeting and regular monthly meeting or over the phone.

President - main duty is to coordinate the duties of all others and chair the steering commitee meeting and preside over the regular meeting. This individual needs to be an organizer and set clear goals and lead the members in achieving them.

Vice President in charge of meeting programs - this individual should be active in the personal computer community and be aware of new developments. He is responsible for arranging the program for each meeting and providing the Newsletter Editor with a feature article keyed to the topic for that meeting. These topics should be scheduled at least three months in advance to allow for the coordination of equipment, speakers, and background material for the newsletter.

Second Vice President - This position has been held by either the software Librarian or the Newsletter Editor/Publisher. In either case this person serves as back-up to the President and first Vice President assisting in the arrangements for the meeting or presiding over either meeting in their absence.

Treasurer - this individual is the business manager of the group. He is accountable for all the money and must supply a monthly report to the newsletter publisher on the state of the treasury. He should generate a budget for the year providing estimates and goals for membership, revenues from advertising, etc. and expenses for newsletter, mailing, etc. He should set up and monitor controls for any business the group might get into and he is responsible for having an audit of the books done at the end of the year prior to turning them over to the new Treasurer.

Secretary - This individual is responsible for recording the minutes of the Steering Commitee and the regular meeting and providing them to the newsletter Editor each month. He is also responsible for all correspondence from the Group and for the transfer of the bank accounts to the new Officers. The Secretary should also keep a running list of goals and action

items to assist the President in the tracking of progress on club projects.

Editor/Publisher - Collects, edits, and puts together all copy and advertising for the newsletter. Gets it printed and delivers it to the distribution manager for mailing.

Production Staff - Assist in the printing or typesetting and paste-up of copy and delivery of masters to the printer (editor does now).

Editors/Writers - Edits and/or writes material for the newsletter, usually in a particular area or for a particular feature. (Pascal, Assembly language, Communications, Games, Calendar, etc.)

Membership Chairman - This individual is responsible for maintaining the membership list and making mailing labels available to the distribution manager each month. He is also responsible for recruiting using direct mail, promotion at the local stores and special programs.

Advertising Managers - Sell advertising thru phone or personal contact and pick up ad copy from client and deliver to publisher. Invoice customer and follow up on collection (editor does now).

Distribution Manager - Coordinate the labeling and sorting of the newsletter for bulk or first class mailing.

Store Distribution - Coordinates the distribution of the newsletter to local retail outlets. (not being done now).

Archivist - Review and catalog all material received each month from the exchange with other clubs. Make this material available to the Editors as a source of material for the newsletter (not being done now).

IAC Liasion - Review the material recieved each month from the IAC. Route the DOM to the Software librarian. Summarize other correspondence for newsletter (editor does now).

Software Librarian -Someone with a good programming background to manage the acquisition, organization, and documentation of software for the NEAT Software library. He should be able to make contact with the IAC and other clubs to promote the exchange of software. He should be able to get the existing software documented and tested so that we can make it available for sale to the members. He should select a DOM to be distributed at each meeting and get one of the members to write it up for the newsletter each month.

Software Reviewers - take software the Librarian has assembled and load it, run it and write up a short description of each program.

DOM Production - bring a system to the meeting each month and make copies of the DOM for the members at the meeting.

Software Sales - makes copies of the software in the library and sells them at the meeting.

Equipment coordinators - bring audio/visual equipment and PA systems to the meeting.

Greeter - Provides name tags to the members at the meeting to identify them and promote communications among the members.

Group Buyer - Reviews and reccomends bulk purchases to the group and handles the collection of funds and the distribution of goods as well as the purchase. (not being done now).

SysOp - Manages the Group's Bulletin Board System (not being done now).

Special Interest Group Chairpersons - Lead discussion and projects for SIGs (SIGNew, SIGPascal, SIGEd, SIGNew, SIGCP/M, SIGComm)

Post Office Pickup - Picks up the mail and distributes it. Membership renewals, money, other newsletters, product literature, requests for advertising info, etc. (editor and treasurer do it now).

Special Project Chairpersons - Applefest, School computer Fairs, Non-Profit Status, Fund Raising Suppers, Swap Meets, Group Outings and Field Trips, etc.

TREASURER'S REPORT

February 1983

Beginning Balance..... $ 2636.71

Revenues:

Membership Dues	$ 285.00
Magazine Sales	9.00
Library Program Sales	68.00
	$ 362.00

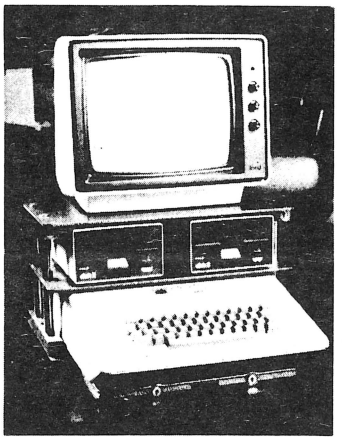
Expenses:

$ 0.00

Ending Balance..... $ 2998.71

Respectfully Submitted,

Larry G. Stamer



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News From The IAC
by Dave Reed

We received a letter from Bernie Urban, Director, Eastern Region and Chairman of the Board. In it Bernie talks about his accomplishments at the IAC and more importantly his feelings on what the IAC should be doing in the future. As you all know we have already cast our vote for Bernie as Director of the Eastern Region but let me mention some of the projects he feels the IAC should try to spearhead. High caliber tutorials on cable TV and other means; Regional meetings to provide you the opportunity to meet your counterparts and to share your respective experiences; low cost mechanisms for you to feed back to the IAC your constructive criticisms. He also enclosed the Official Goals and Objectives of the IAC as of May 1981 which I will reproduce here.

Past, Present and Future Goals and Objectives of the International Apple Core

Status	
	1. The IAC will more actively pursue becoming international.
Present	A. The IAC must financially support bringing the Directors from every region to the Annual Meetings.
Future	B. Any kits, scholarships, and activities should be offered in the regions outside the United States.
	2. The IAC will strive to attain the broadest possible distribution of public information on Apple computers, and will support Apple User Groups in all ways consistent with this.
Past	A. The IAC will have a Director from each region and all regional Directors will physically reside in and actively support the clubs in that region.
Past	B. The IAC will provide a kit to interested Apple users to assist in the formation of new users groups.
Past/ Present	C. The IAC will provide ApNotes of high quality content and print to member clubs more often and will increase the scope of the notes.
Present	D. The IAC will provide a mechanism for each member club to independently provide feedback to the IAC on a regular basis.
Present	E. The IAC will foster the creation of SIGs and support their operation financially and through the provision of technical assistance.
Present	F. The IAC will establish a series of publications to attain the broadest possible information on Apple computers. These include but are not limited to the Orchard, Bulletin, SIG newsletters, ApNotes, and a hardware and software technical series.
Future	G. The IAC will sponsor contests as incentives for the development of high quality software, papers, reviews, and documentation.
Future	H. Since the IAC believes that the support of industry is important to the well-being of the

user groups and ultimately the IAC, we will provide a mechanism by which each of the sponsoring members can provide input and reflect upon computer issues to the regular members. This may be by such means as including publication of their views in the Apple Orchard, presentation of papers at the Annual Meeting, or other means.

Present I. Special Interest Group support must be formalized and publicized. The SIGs were originally founded to provide a forum for special interests which the local clubs could not support. An effective forum mechanism must be in place.

3. The IAC will be financially solvent, and services will be distributed fairly to each region and club.

Future A. Less than half of the total income to the IAC should come from the Orchard by 1982. Funds must be sought from new sources to eliminate single-source vulnerability.

Present B. A financial committee should establish the criteria by which we will judge the IAC's financial health.

Past C. If a professional staff is to be supported, a higher level of funding must be secured by the end of 1981 to pay a staff in 1982.

4. The IAC will be the ethical role model for clubs and the industry.

Past A. No IAC Director or Officer should financially benefit from the IAC fund raising venture.

Present B. Better procedures for the selection of IAC Directors and Officers should be studied and the results implemented in 1982.

Present C. Full financial disclosure should be made by the Treasurer of the IAC at each Annual Meeting.

Past D. Membership standards will be developed so that user groups will be viewed as something positive, organized, and effective, not as pirates as many people see them.

5. The IAC will foster and undertake social purpose activities.

Future A. A scholarship fund will be established to provide highly motivated and talented individuals the means for obtaining specialized training in the computer sciences or related fields.

6. The IAC will become administratively and substantively professional.

Future A. The IAC will, review on an annual basis each existing service and determine whether or not it should be continued as is, modified, or dropped in favor of other more efficient and cost beneficial services.

Past/ Present B. The IAC will conduct in conjunction with its Annual Meeting an Apple Computer Faire/Workshop which may be a part or independent

of other large or small-scale computer related confeences.

Future C. The IAC will establish and perform a research, development, test, and evaluation function pertaining to Apple computers. Activities performed hereunder include but are not limited to: purchase and review of serious works, commissioned works, preparation of special publications, researching new service delivery systems, and conduct of major projects.

Present D. The IAC will foster programming excellence and user satisfaction. Activities in support of this objective include (but are not limited to) developing and promulgating programming, documentation and communication standards.

Future E. The IAC will prepare and conduct, or provide to user clubs, materials which can be used by them to conduct courses, workshops, and lectures on how to program the Apple computer. Such materials may include courseware with extensive printed documentation, audio and visual aids, and self instruction software for the Apple. This material may be provided for sale, or the materials may be provided on a rental basis.

Counsellors Needed for Computer Camp in Brussels, Belgium

by Dave Reed

I have received a letter from ABCD Computer Camps in Brussels, Belgium. They will be introducing U.S.-style Computer Camps to Europe and are planning to run two experimental camps in the Belgian Ardennes over a four-week period in July-August. They are now searching for Senior and Junior Counsellors for the Academic (Computing) and Social Programs.

The camps this year will be for English speaking boys and girls aged 11 to 15. The staff will comprise a Camp Manager who is familiar with the local language (French) and culture, three Senior Counsellors and six to eight Assistant Counsellors. The Assistant Councillors will be English-speaking full-time students in the 17-19 age range.

The Apple has been chosen as the computer and one will be supplied for every two students.

They are offering 30,000 to 60,000 Belgian francs (about $600 to 1200) according to qualifications, plus transportation (of their choice).

Candidates should have experience in the applicable fields of personal computing (e.g. BASIC, PASCAL, LOGO, FORTH, assembler and applications) or recreational animation. Experience in teaching, counselling or other leadership functions for the age group is also expected.

See me if you are interested or contact their U.S. contact:

Mr. F. Moody
43 Forest Rd.
Monroe, Connecticut 06468
Tel: (203) 261-4591

THE WORLD'S LARGEST EXPOSITION EXCLUSIVELY FOR APPLE OWNERS

Each show features hundreds of exhibits of the newest, state-of-the-art products for the Apple. You can see and try out software for every conceivable application—from arcade games to investment programs, music to machine language, teaching systems to accounting packages, word processors to graphics processors. You can sample hundreds of different peripherals, including printers, hard disks, modems, memory cards, video displays and synthesizers, plus accessories, publications and invaluable support services.

Applefest is **the** place to view the most technologically advanced products for the Apple.

At Applefest you can try out and compare hundreds of products in an exciting, information-filled environment. You can learn more in two days than you could in months of visiting computer stores and reading trade journals.

And, best of all, everything on display at Applefest is for sale at special show prices, so you can save hundreds—even thousands—of dollars by making your purchases at the show.

This year a whole new conference program is being introduced to Applefests nationwide. The program will show you how to squeeze absolutely the most power, versatility and usefulness out of your Apple.

Seminars and workshops will teach you the ins and outs of buying software intelligently, using spreadsheet and database programs, putting Apples to work in classrooms and using the Apple as a management tool. You'll learn about new programming languages, important applications for telecommunications, exciting ways to use graphics and more.

No matter what you do (or want to do) with your Apple, the Applefest seminars and workshops will help you do it better.

Software Spotlights will provide an in-depth, understandable look at hundreds of different software packages. Each Spotlight will cover the features, capabilities and limitations of a group of packages, to help you find the software that's best suited to your applications. Experts will be on hand to answer all your questions.

So plan on attending Applefest for 1983—the biggest and best Apple-user show ever. It'll be a mind-expanding experience for both you **and** your Apple.

Daily Registration Fees
Exhibits-only badges are $8 per day, and the Conference Program is $15 per day.

Special Pre-Registration Discount
If you plan to attend Applefest save now with advance registration. Three-day Exhibits and Conference badges are $48, you save $21. Three-day Exhibits only badges at $18, you save $6.

Additional Information
To receive more information about attending or exhibiting at Applefest, including the Conference, Seminar, Workshop and Panel Discussions Program, or information on local hotels call 617-739-2000 or 800-841-7000 (Boston).

Applefest/Anaheim:
Friday-Sunday, April 15-17, 1983
Anaheim Convention Center
10:30AM-5:30PM daily

Applefest/Boston:
Friday-Sunday, May 13-15, 1983
Bayside Exposition Center
10:30AM-5:30PM daily

Applefest/San Francisco:
Friday-Sunday, October 28-30, 1983
Moscone Center
10:30AM-5:30PM daily

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Any Questions? Call 800-841-7000 (Boston)

ANNA PEEL

Okay, so you didn't volunteer for the high school's Sunday 'PANCAKE BREAKFAST BOOSTER-THON'. And you're still feeling guilty about not buying Girl Scout cookies this year. That's okay, bunkie, 'cause you still got a chance to let your good side shine through and help out some deserving souls. Us. Come May, APPLEFEST is going to roar into this here town, and Elliot and I got to round up some warm bodies to get involved at the NEAT booth. (Why heck, some of you reading this got your first taste of NEAT at our booth last year!) You see, all these eager people attending the show are going to mill around our booth asking, 'What is a NEAT?'. And that's where **YOU** come in: to tell all these nice people what a NEAT is!! All we're asking for is 3-4 hours of your time behind the NEAT booth at APPLEFEST to introduce people to NEAT, explain what we do, answer general computer questions and sign up new members. Simple? You bet it is! And what will you get from all of this? A warm glow. A feeling that you've helped people. And a free pass to the show. (El and I aint so stupid to think you'll sign up out of sheer altruism!)

Elliot and I will be asking for volunteers at the next few meetings. If you don't see us there but want to get involved, just give us a call:

John Shaw: 643-2679

Elliot Entin: 862-6418

Remember, for a simple donation of 3-4 hours of your time you'll be helping the club, getting involved, and meeting new friends. And even the Girl Scouts will forgive you.

THE APPLE IIe USER GROUP CONFERENCE

a trip report

by Jerry Connelly

I'm sure you all know that APPLE Computer Inc. has introduced into the marketplace 2 new products... LISA and the APPLE IIe. While LISA is intended to make "the big splash" in the business market, the IIe was designed to take over from the APPLE II+ as the "BREAD-AND-BUTTER" item in APPLE's product line. Indeed, with 700,00+ APPLE IIs already sold it would be hard to imagine not continuing to improve and sell a product like the II+. With this in mind, APPLE expended a great deal of time and money to insure that the IIe would pick up where the II+ left off. The following is a partial list of significant moves made toward this end:

1. Design the IIe hardware such that it is compatible with virtually all peripheral and software currently available for the II+

2. Design the IIe hardware such that it overcomes most of the more widely recognized shortcomings of the II+

3. Design the IIe firmware such that it is compatible with virtually all of the software currently available for the II+. This includes preserving the II+ MONITOR and APPLESOFT firmware wherever possible, maintaining the published entry points into

cont. pg 18

MACHINE LANGUAGE SPOKEN HERE

By Dr. J

The doctor is in.

Well gang, do I feel bad about that scruffy little assembly listing I left you in February's column. This month I'm going to make it up to you by launching into a project we'll play with for several months: using Applesoft arrays from assembly language.

As good as Applesoft is, it lacks several features found on larger computers-one feature it lacks is a built-in library of matrix handling routines. For example, Applesoft doesn't have intrinsic routines for taking the inverse of a matrix, multiplying two matrices, etc. During the next few columns we are going to remedy this by building our own library in assembly language. While we could write matrix routines in Applesoft, our own machine code routines will have some powerful advantages over BASIC:

1. They'll be very fast, in most cases 6-30 times faster than comparable Applesoft routines.

2. Since we don't have to worry about line numbers, this library can be 'dropped in' to any Applesoft program.

3. We'll be able to call the individual library subroutines by name (no more 'GOSUB linnum'). Moreover, our calling Applesoft programs will be able to give these subroutines any name we want!

How will we be able to get our machine code library to run up to 30 times faster than Applesoft? First, of course, we won't have to interpret every program line before we execute it. Second, we'll make use of some pretty elegant array indexing techniques that are not available from Applesoft. Third, we won't check for certain errors, such as whether an array is addressed outside its 'legal' dimension. Of course, this means we could do strange things to memory if we are not careful (heh heh), but after all crashing is one of the risks you take when you want to fly with the eagles.

This month, we will see how Applesoft stores arrays and examine the most efficient indexing scheme available: linear addressing. We will then write a simple machine language routine to take the sum of every element in an arbitrary one-dimensional array.

There are two things we need to know about Applesoft arrays. First, arrays do not start with the index '1', but start with the index '0'. That is, the one-dimensional array A(3) actually has four elements: A(0) through A(3). Similarly, the two-dimensional array B(2,2) has nine elements (3 columns by 3 rows). As it turns out, this method of starting arrays with a zero index reduces the amount of code required to address individual elements in an array; we'll see how this works later on.

Second, Applesoft stores arrays in 'column format'. For example, the one-dimensional array A(3) is stored in four contiguous blocks in memory in the order A(0), A(1), A(2), A(3). By the same token, the two-dimensional array B(2,2) is stored in nine contiguous blocks in memory in the order B(0,0), B(1,0), B(2,0), B(0,1), B(1,1), B(2,1), B(0,2), B(1,2), B(2,2). When using arrays from machine language I find it helps to think of two-dimensional arrays as columns stored one after another.

Addressing array elements down an entire column is fairly easy once we have the address to the top-most element in the column: we simply add an N-byte offset to that address to get the address for the next element down, and so on. This very elegant scheme, known as linear addressing, is the fastest indexing method available because it involves no multiplication, only addition. How large is this offset 'N'? Under Applesoft, floating point (real) arrays require five bytes per element (N=5), and integer arrays require two bytes per element (N=2). (String arrays are an altogether different matter and we will discuss them at a later date.)

Consider the following example: suppose we know the first element for the one-dimensional real array A(3) is stored beginning at memory location $9000 (HEX). Then the remaining elements are stored as follows:

ELEMENT	MEMORY LOC.
A(1)	$9005 (HEX)
A(2)	$900A (HEX)
A(3)	$900F (HEX)

So far so good. How do we find the address of the first element? Remember our old friend 'PTRGET'?, the ROM routine we use to find the address of a variable when we pass an argument list from BASIC to machine language? Well, this routine will also find the address of a particular array element if we include that element in the argument list. That is, PTRGET will return the address $9000 if we set up our argument list with the element A(0), and will return with the address $900F if we set up the argument list with the element A(3)!

We now have all the information we need to try a little exercise: summing the elements in a one-dimensional array and assigning the sum to a scalar variable. In BASIC we could write this routine as:

```
10  C = 0
20  FOR I = 1 TO N
30  C = C + A(I)
40  NEXT
```

To do this in machine language we need simply pass the addresses for C, A(0), and N. The assembly code is shown in Listing #1 and the Applesoft program which calls this routine is shown in Listing #2. The Applesoft program declares the dimension N, dimensions the array A(N), fills the array with 1's, and then calls the machine language routine shown in Listing #1. The machine code first locates the addresses for A(0) and C and stores them in the internal locations ALOW/AHIGH and CLOW/CHIGH. Next, the program picks up the pointer to N, loads its value into the FAC, converts it into an integer and stores it in the internal variable N. The

program then accumulates the sum of the elements and finally assigns the sum to the second variable in the argument list, C. In accumulating the sum, the program starts out with the 'base' address to the array (ALOW/AHIGH) and increments this address by five bytes every time it picks up another element to add to the total. (You might notice we speed up the execution by always keeping the intermediate sum in the FAC itself; we don't send it back out to memory after every addition. This trick is not available in BASIC, and the exercise illustrates how machine language programming can allow highly efficient code.) A preliminary benchmark indicates the machine language routine runs 6-8 times faster than Applesoft.

Before we leave, I want you to consider two variations on this example. The first one is this: suppose we only want to take the sum of the three elements beginning at, say, A(5)? Can you think of a way to do this by changing the value of N and by changing the arguments in the calling argument list? Try it! The important point here is this machine language routine will even let us perform operations on a portion of the array; the trick is knowing how to set up the argument list and the variables appearing in that list.

The second variation is pretty nefarious and leads to an unexpected result: what happens if we remove line 140 from the program? Do we get the result we

ISTING #2

```
SOURCE FILE: ARRAY ADDER

0000:                1 ;*************************
0000:                2 ;
0000:                3 ; ARRAY ADDER
0000:                4 ;
0000:                5 ;THIS PROGRAM SIMULATES THE
0000:                6 ;
0000:                7 ;C=0
0000:                8 ;FOR I=0 TO N
0000:                9 ;C=C+A(I)
0000:               10 ;NEXT I
0000:               11 ;PRINT C
0000:               12 ;
0000:               13 ;
0000:               14 ;THE COMMANDS ENTERED FROM
0000:               15 ;BASIC ARE:
0000:               16 ;CALL 768,A(0,0),C,N
0000:               17 ;
0000:               18 ;THIS CODE IS ULTRA-FAST BECAUSE
0000:               19 ;THE INDEXING SIMPLY STEPS THROUGH
0000:               20 ;THE ARRAY IN A LINEAR MANNER.
0000:               21 ;
0000:               22 ;*************************
0000:               23 I      EQU  $0      ; 'I' INDEX
0001:               24 N      EQU  $1      ; NO. ELEMENTS PER COLUMN
DFE3:               25 PTRGET EQU  $DFE3   ; GET VARIABLE NAME AND FIRST VALUE
DEBE:               26 CHKCOM EQU  $DEBE   ; CHECK FOR COMMA
EAF9:               27 MOVFM  EQU  $EAF9   ; MOVE (Y,A) INTO FAC
EB2B:               28 MOVMF  EQU  $EB2B   ; MOVE FAC INTO (Y,X)
E6FB:               29 CONINT EQU  $E6FB   ; MOVE INT(FAC) INTO X-REG
E7BE:               30 FADD   EQU  $E7BE   ; ADD FAC (Y,A) AND STORE IN FAC
----- NEXT OBJECT FILE NAME IS ARRAY ADDER.OBJ0
0300:               31        ORG  $300
0300:20 BE DE       32        JSR  CHKCOM  ; PICKUP FIRST COMMA
0303:20 E3 DF       33        JSR  PTRGET  ; GET POINTER TO A(0,0)
0306:8D 63 03       34        STA  ALOW
0309:8C 64 03       35        STY  AHIGH
030C:20 BE DE       36        JSR  CHKCOM  ; GET NEXT COMMA
```

expect? Try it and tell me what you find out. Can you figure why the routine fails to work? I bring up this variation as a reminder that machine language provides no 'safety net': preparation is very important. I will clear up this mystery in next month's column.

That wraps it up for now. Next month we will look at addressing schemes for two-dimensional arrays. Till then, good luck!

The doctor is out.

LISTING #1

```
10  REM  THIS APPLESOFT ROUTINE
20  REM  CALLS A MACHINE LANG.
30  REM  PROGRAM TO ADD THE
40  REM  ELEMENTS IN A 1-DIM
50  REM  ARRAY AND ASSIGN THE
60  REM  SUM TO A SCALAR.
65  REM
70  REM  NOTE: BLOAD THE MACH.
80  REM  LANG. CODE BEFORE USING
90  REM
100 N = 100
120  DIM A(N)
140 C = 0
160  FOR I = 1 TO N
180 A(I) = 1
200  NEXT
220  CALL 768,A(0),C,N
240  PRINT C

]
```

```
030F:20 E3 DF   37          JSR  PTRGET   ; GET POINTER TO C
0312:8D 65 03   38          STA  CLOW
0315:8C 66 03   39          STY  CHIGH
0318:20 BE DE   40          JSR  CHKCOM
031B:20 E3 DF   41          JSR  PTRGET   ; GET POINTER TO N
031E:20 F9 EA   42          JSR  MOVFM
0321:20 FB E6   43          JSR  CONINT
0324:E8         44          INX
0325:86 01      45          STX  N        ; STORE INTEGER VALUE
0327:A9 00      46          LDA  #$0      ; SET FAC TO ZERO
0329:85 9D      47          STA  $9D
032B:85 9E      48          STA  $9E
032D:85 9F      49          STA  $9F
032F:85 A0      50          STA  $A0
0331:85 A1      51          STA  $A1
0333:85 A2      52          STA  $A2
0335:85 00      53          STA  I        ; INITIALIZE I
0337:AD 63 03   54 DOLOOP   LDA  ALOW     ; GET THE POINTER TO THE CURRENT ELEMENT
033A:AC 64 03   55          LDY  AHIGH
033D:20 BE E7   56          JSR  FADD     ; ADD IT TO THE VALUE IN FAC
0340:18         57          CLC           ; PREPARE TO ADD THE 5-BYTE OFFSET
0341:A9 05      58          LDA  #$5
0343:6D 63 03   59          ADC  ALOW     ; UPDATE THE POINTER TO THE NEXT
0346:8D 63 03   60          STA  ALOW     ; ELEMENT IN THE COLUMN
0349:A9 00      61          LDA  #$0
034B:6D 64 03   62          ADC  AHIGH
034E:8D 64 03   63          STA  AHIGH
0351:E6 00      64          INC  I
0353:A5 00      65          LDA  I        ; HAVE WE COMPLETED THE LOOP?
0355:C5 01      66          CMP  N
0357:D0 DE      67          BNE  DOLOOP
0359:AC 66 03   68          LDY  CHIGH    ; LOAD H.O. ADDRESS TO C
035C:AE 65 03   69          LDX  CLOW
035F:20 2B EB   70          JSR  MOVMF    ; C = FAC
0362:60         71          RTS           ; BACK TO APPLESOFT
0363:00         72 ALOW     DFB  $00      ; L.O. ADDRESS TO A(0,0)
0364:00         73 AHIGH    DFB  $00      ; H.O. ADDRESS TO SAME
0365:00         74 CLOW     DFB  $00      ; L.O. ADDRESS TO C
0366:00         75 CHIGH    DFB  $00      ; H.O. ADDRESS TO SAME

*** SUCCESSFUL ASSEMBLY: NO ERRORS
```

same and even preserving the well known and much loved bugs therein (strictly for compatibility ... honest).

4. Make the announcement of the IIe, its availability at the dealer showrooms, the launching of a massive marketing campaign and the discontinuance of II+ production simultaneous events.

5. Place APPLE IIe hardware, software, development guidelines / aids and a development support hotline in the hands of 100+ well known and qualified software developers 3 to 6 months prior to the impending IIe release. This to insure, not only, software compatibility, but that plenty of software exists that will take advantage of the IIe's new features.

6. Invite major dealers from around the world to APPLE headquarters for seminars on the IIe hardware, software, service and sales.

7. invite 100+ presidents (even yours truly) of user groups all over the world, at APPLE's expense, to a IIe seminar in Santa Clara, Ca. The intent - to insure existing user support and continued sales and marketing assistance by word of mouth recommendations.

We, quite naturally, accepted the invitation and spent an enlightening 4th, 5th and 6th of March as the guest of APPLE Computer Inc. at the Marriot hotel at Santa Clara.

Having attended far more than my fair share of events such as these (from both sides of the counter), it is essential that I take a moment to tip my hat to the APPLE folk responsible for this event - they were good. They also obviously had the backing of management and the budget to get the job done. The organization was expert, the accommodations and meals were well planned and of high quality and , most importantly, we were treated as though we mattered. A major feat for this kind of event, especially when you consider that APPLE picked up the tab.

The basic information provided by this seminar was:

- a guided tour through the history of APPLE Computer Inc. This entertainingly done by Phil Roybal.

- Individual discussions and q/a sessions with each of the project leaders for IIe hardware, firmware, marketing, support and service areas. These sessions were conducted by the actual people involved in the development process - a nice touch.

The agenda for the three days was set up to maximize the use of our time for exposure to APPLE and, not incidentally, to each other. The agenda follows:

FRIDAY	MARCH 4
6:00 - 8:00	WELCOME COCKTAIL RECEPTION AND BUFFET
SATURDAY	MARCH 5
8:00 -9:00	CONTINENTAL BREAKFAST
9:00 - 9:15	WELCOME Paul Dali, General Manager, PCS Division
9:15 - 10:00	AN INTRODUCTION TO APPLE Phil Roybal, Manager, Communications
10:00 - 10:15	BREAK

10:15 - 10:45	THE APPLE II WAS A HARD ACT TO FOLLOW George Johnson, IIe Product manager
10:45 - 11:30	THE IIe - A CLOSER LOOK Peter Quinn, IIe HARDWARE MANAGER
11:30 - 1:00	LUNCHEON
1:00 - 2:00	THE AUXILIARY SLOT Walt Broedner, IIe Logic Designer
2:00 - 3:00	IIe firmware Rick Auricchio, IIe Firmware Developer
3:00 - 3:15	BREAK
3:15 - 3:45	WHAT WAS DONE TO BRING THE IIe TO THE WORLD Sue Berman, IIe Product Manager
3:45 - 4:15	APPLE'S SERVICE AND SUPPORT IIe Service Manager
6:00 - ?????	COCKTAIL RECEPTION POS DIVISION INTRODUCED LISA This was held in San Francisco at Earthquake McGoons after dinner we attended a live performance of a musical comedy at FUGAZI's. Transportation by APPLE

SUNDAY MARCH 6

8:00 - 9:00	BREAKFAST
9:00 - 11:30	IIe HANDS-ON SESSION
11:30 - 1:00	LUNCHEON

So much thought and effort went into the II+ compatibility area that it was almost possible to lose sight of the new features. That would be a mistake because they are very beneficial to anyone who thought the APPLE II+ was a great machine (who didn't?)

The new features can be examined in five main categories. Each of these features represent an evolutionary extension to the II+ and are as follows:

1. Firmware - this has been improved while maintaining compatibility with the II+. It has built-in self-diagnostic tests (user-invokable) and new video handling routines.

2. Back panel - this has been completely redesigned to meet FCC requirements and to provide standardized connection to the display device, game controllers and up to 12 other peripherals. You can now unplug them instead of dragging them around by the cables.

3. Main logic board - 64k on-board ram, 16k rom, new slot arrangement including a new auxiliary slot with greater access to main board signals, and far fewer parts (read that heat and later probably bucks).

4. Keyboard - well now (at last) it has been enhanced. The full ASCII set, function keys, cursor keys and (get this) a real shift key for (of all things) upper and lower case.

5. Video display - it has been improved too. Upper/lower case and inexpensive expandibility to 80 column format.

This highlights the features of the IIe and the conference,but you should be aware that this machine has new electronics and a new layout internally that will facilitate the development of whole new categories of option boards some of which are in the works now. New video output, 80 column plus 64k on the same board and more. Remember that auxiliary slot..... WATCH FOR IT!!!

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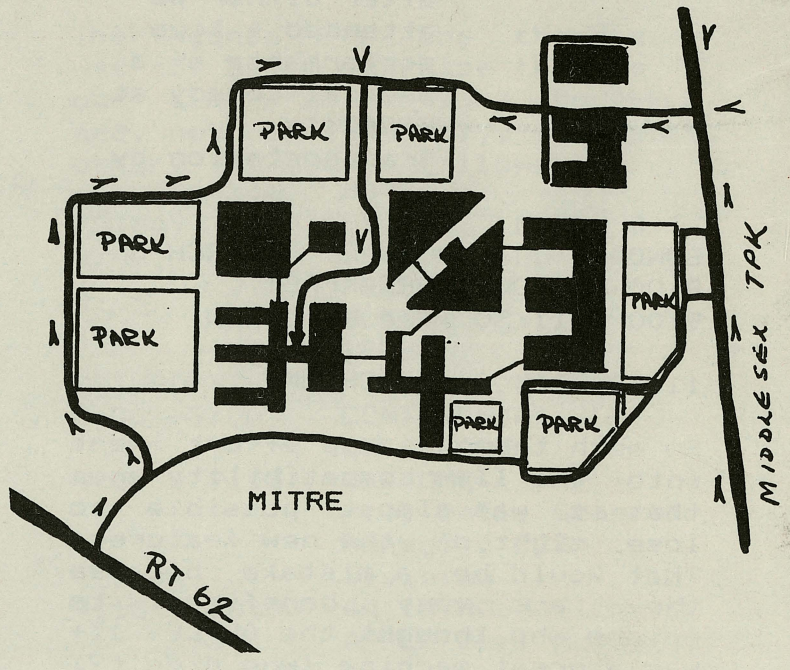
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